

ON THE ANATOMY OF *HEMIPLECTA FLOWERI*, E. A. SMITH, FROM PERAK, MALAY PENINSULA; WITH NOTES ON SOME OTHER EASTERN GENERA.

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PLATE IV.

HEMIPLECTA FLOWERI, Smith.

EARLY in the present year I received from Mr. Stanley Flower a spirit specimen of this fine species, labelled Larut, Perak. About the same time some shells had been presented to the British Museum (Natural History), and were shown to me by Mr. E. A. Smith, who described the species before this Society in March. In February I began an investigation of its anatomy, but could not complete the drawings in time for Mr. Smith's paper. These I am now able to submit.

EXTERNAL FEATURES. — The living animal is apparently black, or grey-black, and, judging from the wrinkled condition of its edge in the spirit specimen, the foot probably spreads out thin and flat when the animal is in motion, as seen, to name a striking instance, in the large *Eucochlias ochthoplax*, Bens., the foot of which is often extended till it forms a thin oval disc, giving great holding power. The peripodial fringe is very marked, streaked with pale lines on the black ground; the parallel grooves so distinctive in many genera of the Zonitidæ are not apparent.

The sole of the foot is not divided; the whole surface is wrinkled by contraction. This in life would probably be quite smooth, while the mucous gland (Pl. IV, Fig. 1) would apparently be broad and open, without any very marked overhanging lobe. The mucous gland does not extend to the sole of the foot. There is a right shell-lobe (Figs. 2 and 5), situated at a short distance below the upper inner angle of the aperture; also a well-developed left shell-lobe (Fig. 3), tongue-shaped, and given off from the narrow peristomatic edge. The left neck-lobe is divided into two very distinct and widely separated portions (Fig. 3). At the lower angle of the aperture (Fig. 4), and corresponding with the dark band of colour round the umbilical region, there occurs an expansion of the shell-lobe, which we may term the 'umbilical, or columellar lobe,' and the breadth of this is indicated by one or more shallow grooves on the surface of the shell itself. There is also (as noted by

Mr. Smith) a single, shallow, but well-marked groove following the suture about 6 mm. from it. This is also indicated on the edge of the shell-lobe by slight notching or folding (Fig. 2). The inside surface of the mantle zone resting against the umbilical margin was, I noticed, of a red-brown colour, corresponding to the coloration of the shell within the umbilicus. But it seems to me more likely that this was a stain extracted by the alcohol from the shell after death, rather than the remnant, in this part of the animal, of the colouring matter which produces the band.

The shell-muscle is strengthened by a peculiar, flattened, disc-like expansion (*s.m.*, Figs. 7-9), which I have not observed before in any other species. Close to this, internally, are situated the attachments of the retractor muscles of the buccal mass, amatorial organ, etc.

INTERNAL ANATOMY.—The *salivary glands* are disposed in two thin, flat masses, connected with each other and covering the stomach. The *buccal mass* is short and flat on the basal side. The *jaw* (Fig. 10) has a large central projection.

The *radula* (Fig. 11) has the formulæ—

$$\begin{array}{ccccccc} 83 & : & 18 & : & 1 & : & 18 & : & 83 \\ & & & & & & 101 & : & 1 & : & 101 \end{array}$$

The central tooth and 18 admedian teeth are straight-sided; the next 34 lateral teeth—that is, up to the 52nd—are aculeate; the 31 uncini are bicuspid.

Genitalia (Fig. 6).—The amatorial organ, which is proportionately of great length (75 mm.), tapers to the retractor muscle. The spermatheca is long, broad at its base, gradually dwindling to a well-defined connective muscle attached to the oviduct. The male organ (Fig. 6*a*), which tapers from the generative aperture backward, is bent on itself, the two portions being attached about midway by muscular tissue (*m.*). It then leads up to the short kalk sac (*k.*), and the vas-deferens (*v.d.*) enters it at the side. Above the bend a cæcum is given off, which presents one single coil, and to the rounded apex of this the retractor muscle is attached (Fig. 6*a*). We have here some interesting details illustrative of the variation met with in these animals, and serving to distinguish this species from other large forms. Compared with the type species of *Hemiplecta*, the male organ is similar, save that in *H. Humphreysiana* there is no cæcum, whereas in this Perak species a cæcum, approaching in form that of *Macrochlamys*, is present. The spermatheca of *Hemiplecta Humphreysiana* is rather short, and pear-shaped, not long, and narrowing to an attachment muscle. There is some difference in the relative position of the right shell-lobe in the two species: in the Perak form it is given off at a lower point on the mantle zone, and this is also the case in some other species. The radula is of the same type in both, and if the admedians be added to the curved aculeate laterals the number is identical, viz. 70 : 1 : 70, the difference in the total number being made up in the outermost bicuspid teeth. The jaw of the Perak snail has a much larger central projection. These differences do not outweigh the similarity of the

radula, and shell and dorsal lobes, and I therefore leave it, where Mr. E. A. Smith placed it, in *Hemiplecta*.

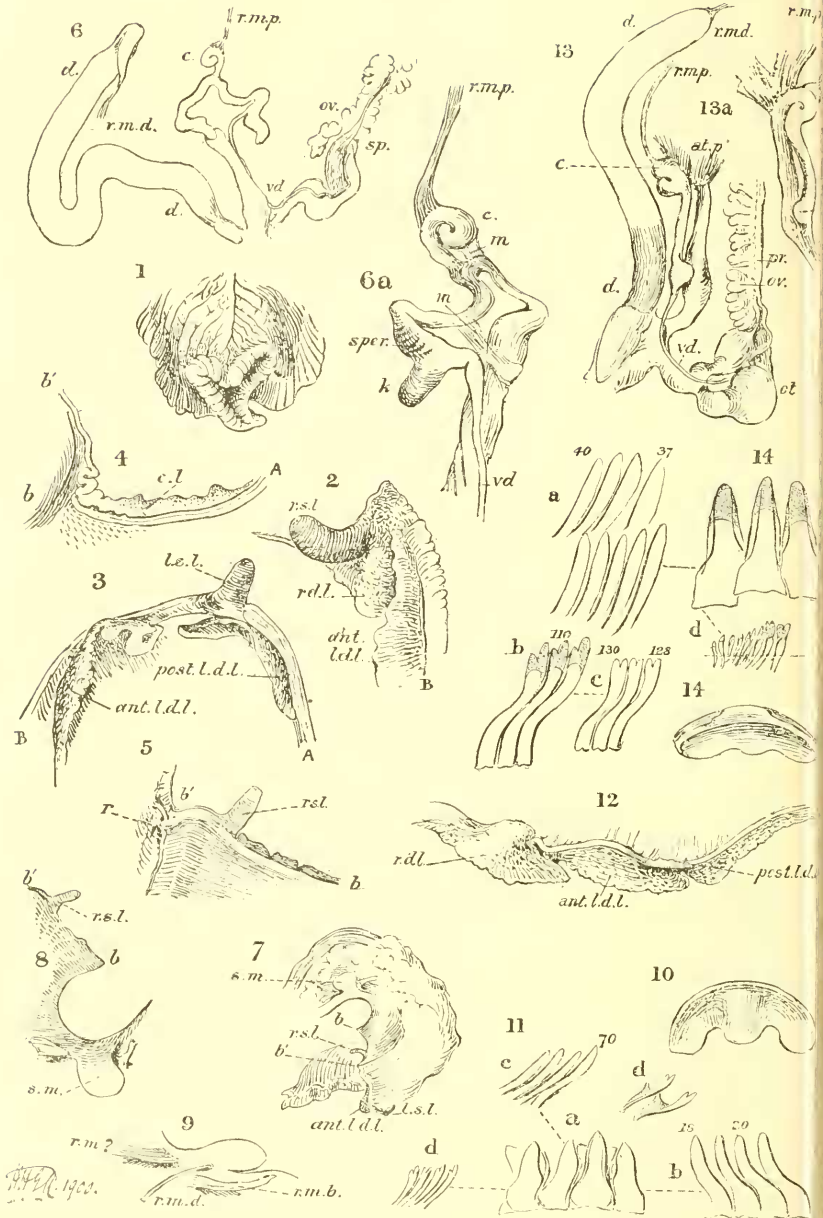
HEMIPLECTA NEPTUNA, Pfr.

Specimens of another large land-shell, taken in Siam, exact locality not stated, have lately been received from Mr. Daly. These, thanks to our President, I have examined: with one exception they were not in the best state of preservation. They had been identified as *H. distincta*, Pfr., but I now believe, for reasons given below, that they are *H. neptuna*, Pfr.

EXTERNAL FEATURES.—No right shell-lobe is present, but there is an indication of a small left shell-lobe (Fig. 12) just above the division of the left dorsal lobe into the usual anterior and posterior parts: it is represented by a slight widening and turning back of the edge for 3 mm. The left dorsal lobes are very narrow for the large size of the shell. At about 12 mm. from the respiratory orifice is the division between these dorsal lobes, 2 mm. wide; the posterior portion commences and continues as a distinct narrow lobe for 19 mm. The foot, which appears to have been of a ruddy ochre tint, is streaked and blotched sparingly in one specimen with dark grey; in the others it was plain. The peripodial margin is nearly 3 mm. in width, but the two parallel grooves above it are not conspicuous. The central area of the foot is not defined. The segment-like cross-lines of the peripodium can be followed beneath the edge of the foot, and at a short distance disappear. The mucous pore is broad, triangular in shape, similar to that of *Haughtonia conferta*, Pfr.

INTERNAL ANATOMY.—*Genitalia* (Fig. 13).—The amatorial organ is very long, about 45 mm., with a diameter of 4 mm. To its posterior, rounded end is attached a long retractor muscle, unusually broad in one specimen. The male organ (Fig. 13a) agrees in general with that of *Hemiplecta Humphreysiana* and *H. Floweri*, the kalk-sac being small as in those species; it varies, however, in the portion near the attachment of the retractor muscle. Where the penis bends on itself, a broad muscle lies along the edge, then follow a sharp bend and a short blunt caecum-like process, from which a long thin muscle extends: the latter is always present; but the broad muscle here seems additional. The spermatheca is attached at its usually free end by well-developed muscles to the base of the oviduct; it is short, oval, rather transparent, on a thick, short stem. There is a large globose swelling on the free oviduct, and as it came into view during dissection among the genitalia and other organs of the body it was very conspicuous by its yellow colour. I have suggested that a similar enlargement present in some other genera in this position may be an ovithea. Its precise function has yet to be discovered, but this may possibly be gleaned by studying sections.

Radula (Fig. 14).—The central tooth is long and narrow; the admedian teeth are plain, straight-sided, and there are more than



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